



The National Satellite Land Remote Sensing Data Archive in the Department of the Interior

The National Satellite Land Remote Sensing Data Archive Advisory Committee

Presented by

**Prof. Joanne Irene Gabrynowicz, Co-Chair
National Remote Sensing and Space Law Center
University of Mississippi School of Law
www.spacelaw.olemiss.edu**

Land Remote Sensing and DOI

◆ 1966

- Initiated Earth Resources Observation Systems program
- “...the time is now right and urgent to apply space technology towards the solution of many pressing natural resource problems being compounded by population and industrial growth.”
-- Secretary of the Interior
Stewart L. Udall (1966)

◆ 2003

- Owns and operates *Landsats 5 and 7*
- Archives Earth observation data from 6 operational satellites

The Archive Mission: A National Asset

- ◆ **Maintain** a permanent, comprehensive Government archive of global *Landsat* and other land remote sensing data.
- ◆ **Provide** long-term storage, maintenance, and upgrading of a basic, global, land remote sensing data set... **and ensure timely ready access for parties requesting data.**

P.L. 102-555

DOI Responsibilities

- ◆ **Populate** the Archive
- ◆ **Preserve** the Archive -- **HOLD in TRUST**
- ◆ Provide **Access** to the Archive
- ◆ **Distribute** Products from the Archive
- ◆ **Manage and Improve** the Archive

DOI is the Nation's archive for land remote sensing and other Earth surface data.



U.S. Department of the Interior National Satellite Land Remote Sensing Data Archive Advisory Committee

Purpose

- ◆ **Solicit multidisciplinary advice for the National Satellite Land Remote Sensing Data Archive's long-term direction and goals.**

U.S. Department of the Interior National Satellite Land Remote Sensing Data Archive Advisory Committee

Objectives^[1]

- ◆ **Assist in defining and accomplishing the NSLRSDA's archiving and access goals to carry out the requirements of the Land Remote Sensing Policy Act;**
- ◆ **Advise the USGS/EDC on priorities of the NSLRSDA's tasks; and,**
- ◆ **Provide interdisciplinary guidance and serve as a resource to USGS/EDC on issues of archiving, data management, science, policy, and public-private partnerships.**

^[1] **U.S. Department of the Interior Charter; National Satellite Land Remote Sensing Data Archive Advisory Committee, signed March 24, 1998**

U.S. Department of the Interior National Satellite Land Remote Sensing Data Archive Advisory Committee

Charge^[1]

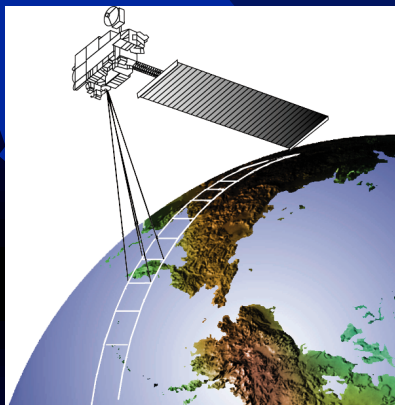
- ◆ Determine what the preservation priorities are in an era of limited resources, and
- ◆ Commit yourselves to advocate the highest practical level of authenticity and integrity in data stewardship.

^[1] Minutes Second National Satellite Land Remote Sensing Data Archive Workshop, October 8-9, 1997.

More later....

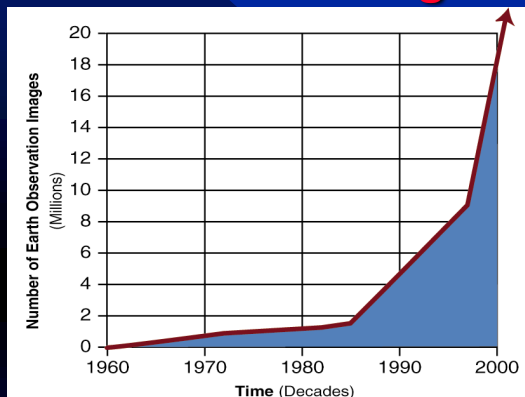
Land Remote Sensing from Space: Acquisition to Applications

Earth Observation Satellites



- Declassified Systems
- Landsat 1-5
- NOAA – Polar Orbiting
- Shuttle Radar
- Landsat 7 (1999)
- NASA-EOS (2000)
- High Resolution Systems

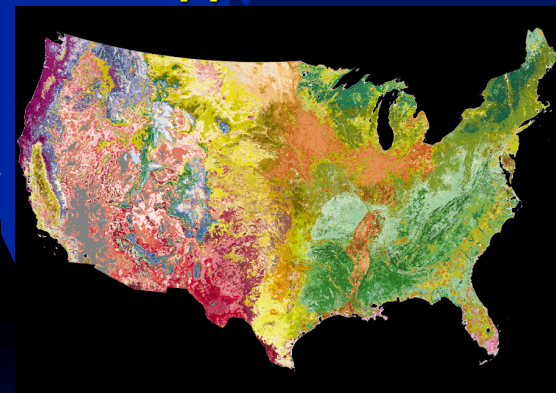
DOI-USGS National Archive Challenge



- Preserve
- Provide Access
- Process
- Reproduce
- Distribute

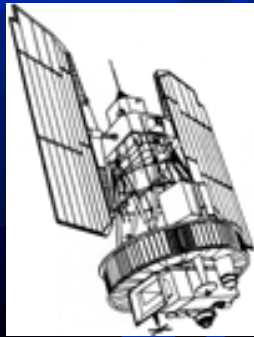
Hold in Trust

Data Applications



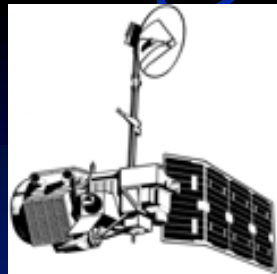
- Land Cover Change
- Land Use Monitoring
- Fire Danger Rating
- Public Lands Management
- Environmental Monitoring
- Natural Hazards Response
- Homeland Security

The *Landsat* Program: A Commitment to Earth Observation



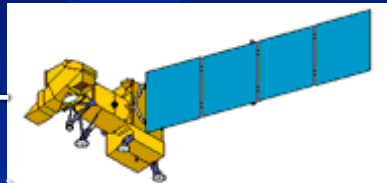
Multi-Spectral
Scanner (MSS)
(79 meter)
Landsats 1-5

	<u># of Images</u>	<u>Dates</u>	<u>Volume</u>
◆ Landsat MSS	631,000	72 - 92	19 Terabytes



Thematic
Mapper (TM)
(30 meter)
Landsats 4-5

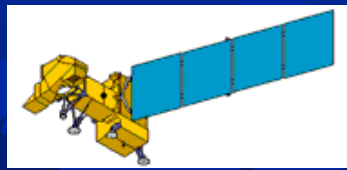
	<u># of Images</u>	<u>Date</u>	<u>Volume</u>
◆ Landsat TM	505,000	82 - 2003	140 Terabytes



Enhanced
Thematic Mapper-
plus (ETM+)
(15 meter/30 meter)
Landsat 7

	<u># of Images</u>	<u>Dates</u>	<u>Volume</u>
◆ Landsat ETM+	340,000	99 - 2003	231 Terabytes

Landsat Data Continuity Mission

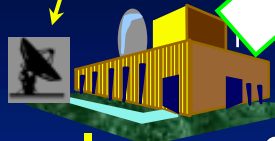


Raw data



Landsat users

- Federal Agencies,
- State/Local Gov't,
- Value Added Firms
- Public
- Academia



• 250 scenes per day
• Delivery via T-3 or Tape
• Goes to Archive for unrestricted access per P.L. 102 - 555

10 scenes per day



NASA Calibration and Validation System



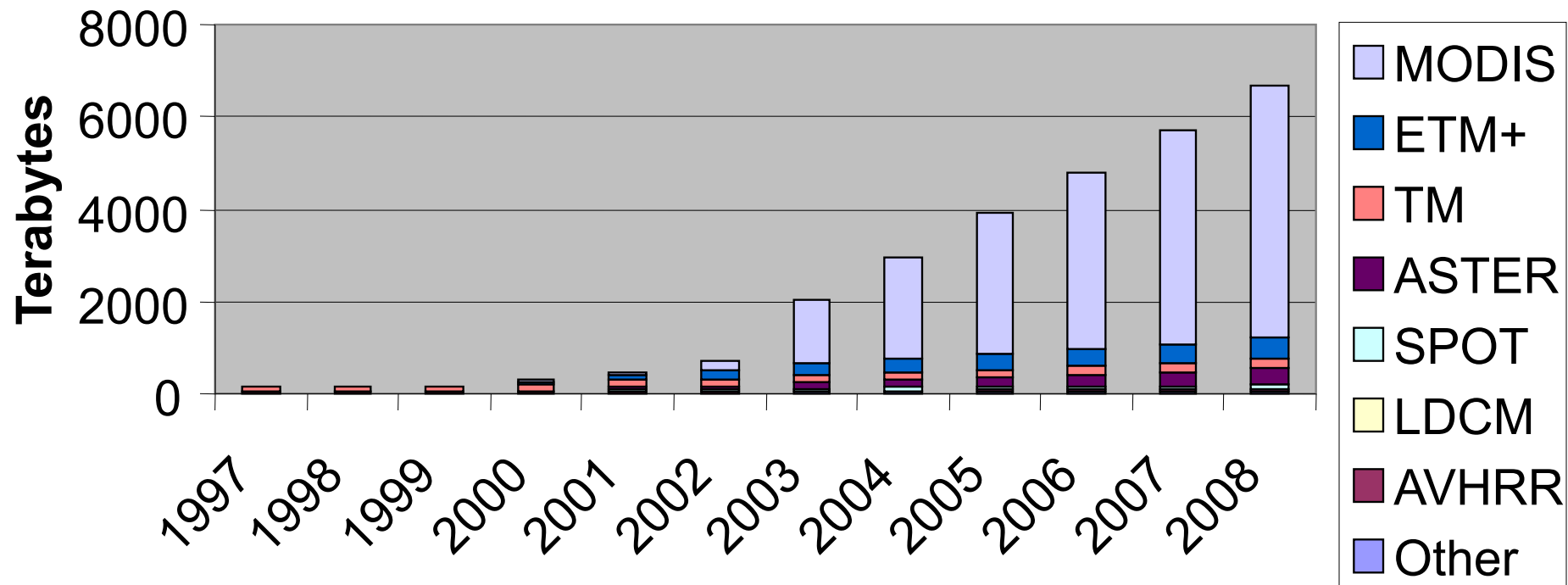
Commercial Users

LDCM Contractor

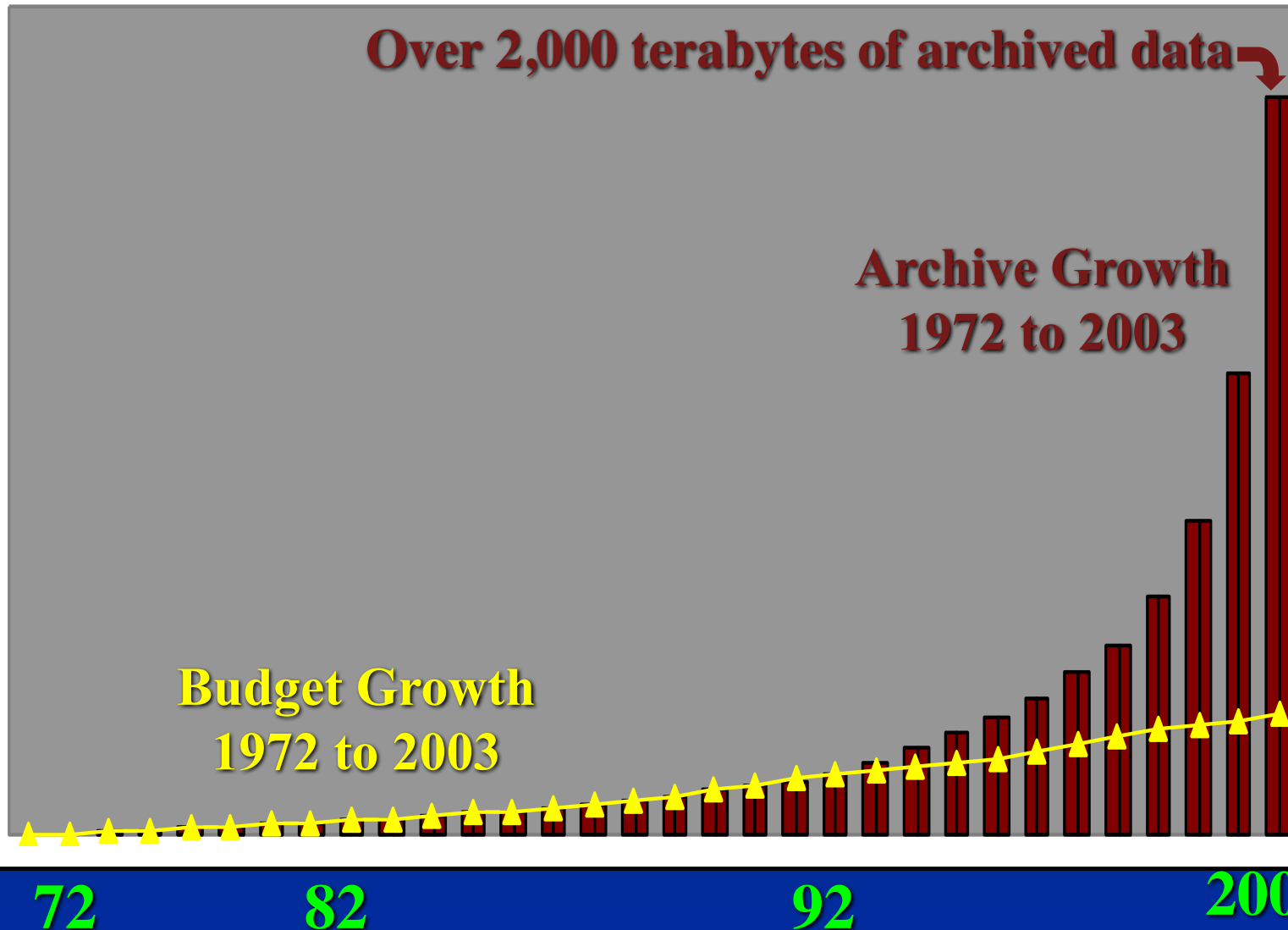
Derived products, Worldwide Agriculture, Value-Added Firms, Nat'l Security

Archive Challenge: Exponential Growth

USGS Land Remote Sensing Program Digital Holdings & Projections



Archive Growth vs Budget Growth



Archive to budget ratio is growing at an unprecedented rate.

Current Budget \$9.3 million

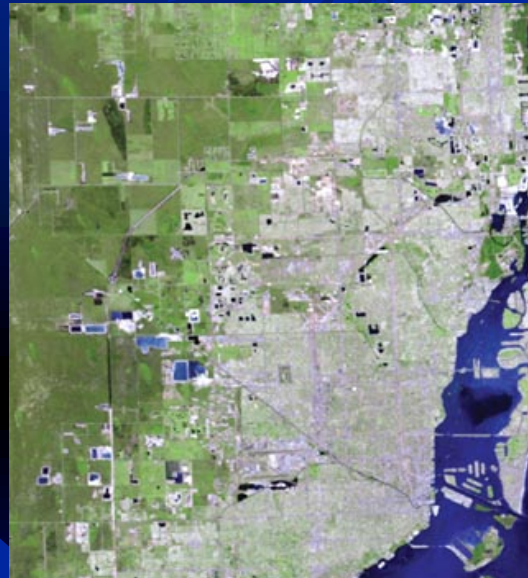
The Archive and Urban Expansion in Las Vegas



This Landsat image shows Las Vegas in 1973 (**population 358,400**). Purple areas represent roads and other urban infrastructure. Green represents vegetation.

By 2000, Las Vegas (**population 1,563,280**) had sprawled in almost all directions, especially in the Northeast and southeast.

The Archive and Urban Encroachment in the Everglades



An ecosystem changed – South Florida was once a 23,000 km square unbroken marshland of sawgrass and small tree islands, now threatened by encroachment from urban areas.



Urban Edges

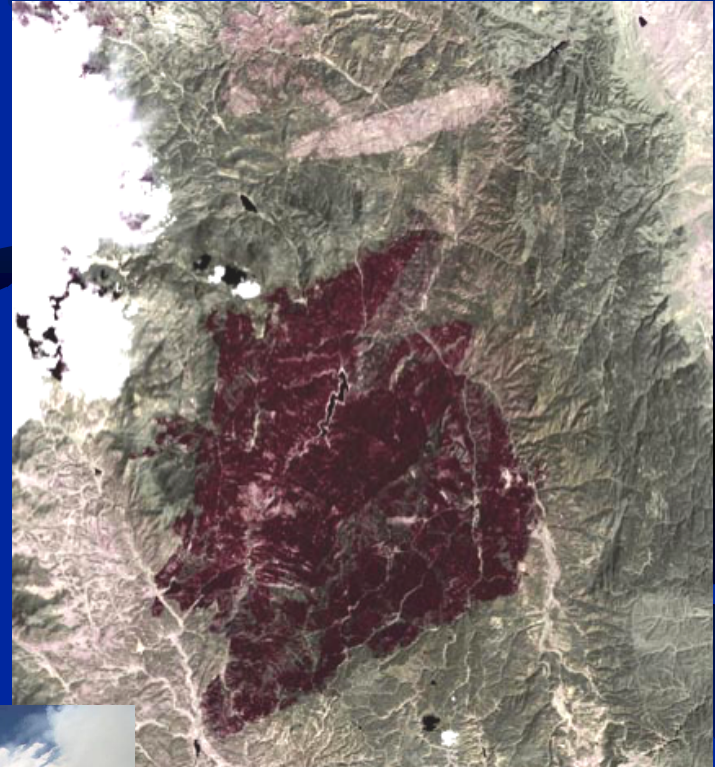


The Archive and Colorado Fires

2001



2002

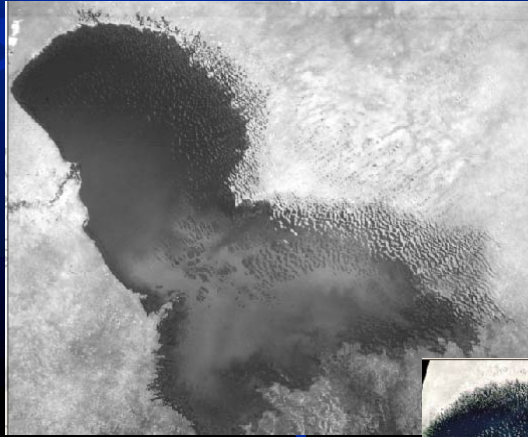


May 2001: Landsat image shows healthy vegetation in various shades of green.



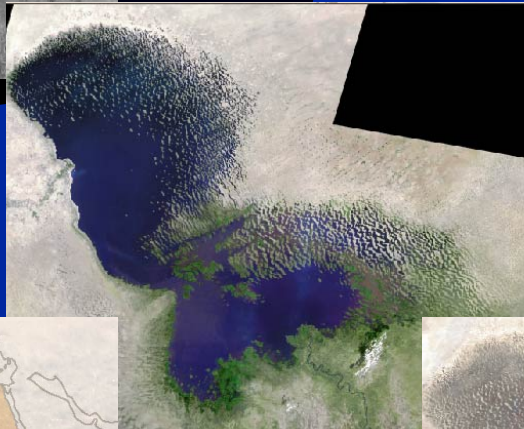
June 2002: Landsat image provides a view of the Hayman fire after it burned an estimated 113,000 acres.

The Archive and Water Resources of the Lake Chad Basin



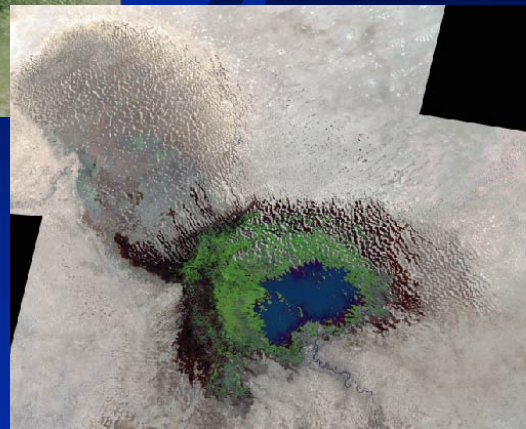
1963

This declassified satellite image shows the extent of the Lake Chad Basin, once the sixth-largest lake in the world.



1987

This Landsat MSS image begins to illustrate the decline of the Lake Chad Basin.



1999

This Landsat ETM+ image shows the remaining surface area of Lake Chad, now 1/10 its size in the 1960s.

The Archive Advisory Committee 1998 - 2002

- ◆ **Consults**

- Multidisciplinary experts

- ◆ **Cooperates**

- Industry, government, academia

- ◆ **Communicates**

- To the Secretary via direct reports

- ◆ **In the service of conservation**

Committee Work Product: 1998 - 2002

◆ White Papers

- **Policy and terms of reference**, January 1999
 - ✦ Archive is an inherently government function
 - ✦ Clearly defined levels of processing
- **Restricted data access**, April 2000
 - ✦ May acquire restricted data with a sunset clause on use restrictions
 - ✦ Negotiate with commercial vendors unconditional access to, and use of, restricted data for disasters and humanitarian efforts

◆ Recommendations

- Establish a data policy for the Archive -- **Drafted Archive Policy**
- Expand relationship to land remote sensing data users - **increase visibility**
- **Engage the private sector** in a more substantive and meaningful way
- Define data acceptance criteria -- **Data Sieve**

<http://edc.usgs.gov/archive/nslrda/index.html>

Summary

◆ Congress established the Archive in 1992

- It is a national asset - USGS/EDC, Sioux Falls, SD
- DOI Secretary is responsible for it - 15 U.S.C. 5601 et seq.
 - Commercial Remote Sensing Policy authorized April 25
 - Implementation Plan in-work – DOI lead, + NASA, NOAA

◆ The Archive is growing exponentially

◆ It serves important priorities, e.g.:

- Tracking urban growth
- Hazards management
- Homeland Security
- Conservation
- Land Use Trends Monitoring
- Global User Community

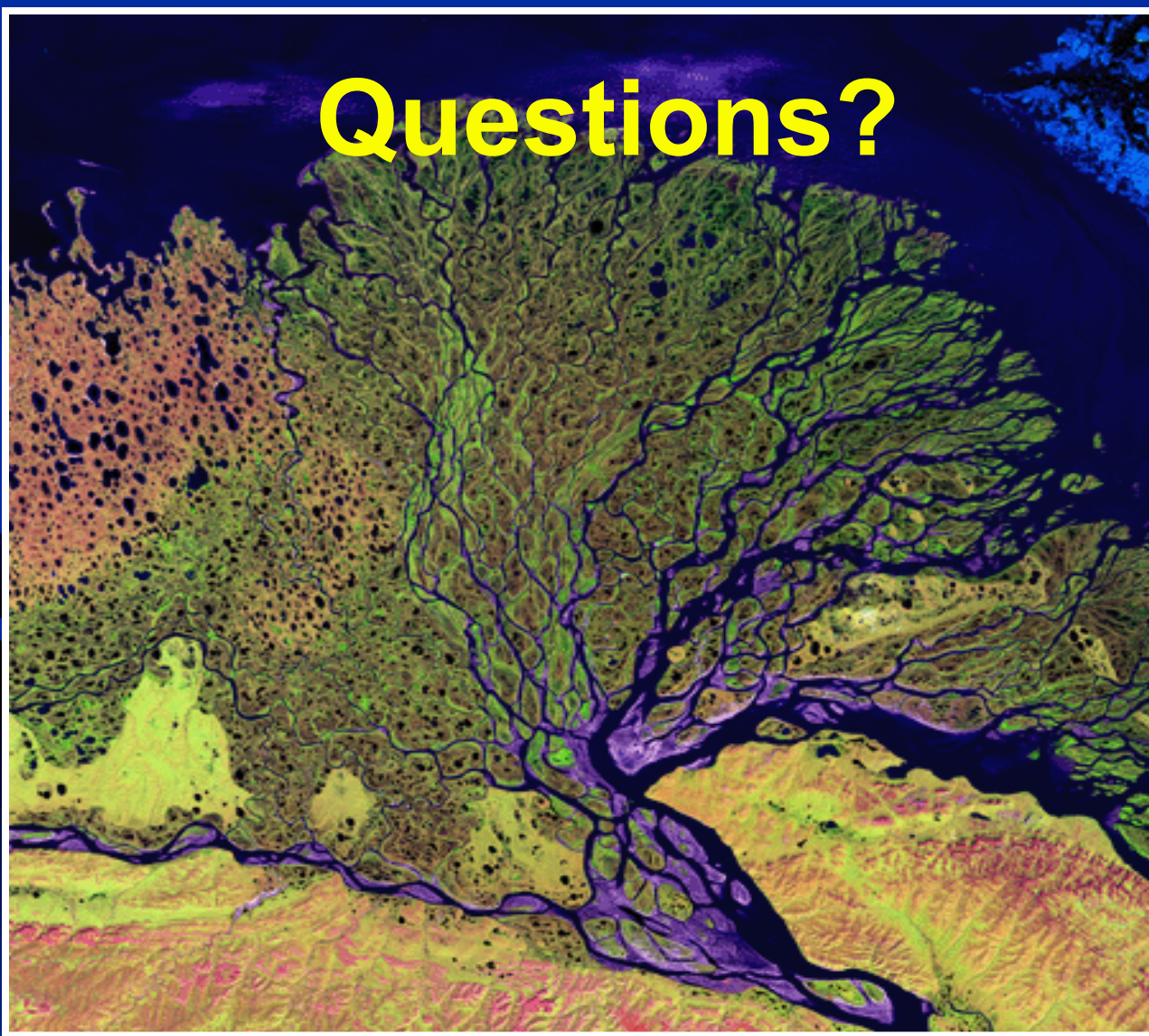
◆ DOI is a satellite operations agency - *Landsat 5 & 7*

- Committed to long-term satellite operations
- Landsat Data Continuity

Key Points

- ◆ **DOI is the operational land observation agency**
 - **DOI is to land observations as NOAA is to weather observations.**
- ◆ **DOI does not have** the resources to perform its mission as the Nation's archive for land remote sensing data and to ensure long-term data continuity.

Questions?



“Of all national assets, archives are the most precious; they are the gift of one generation to another and the extent of care of them marks the extent of our civilization.”

Sir Arthur G. Doughty, Dominion Archivist from Canada, 1904-1935